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12-14 June 2007, at US Naval Academy, Annapolis, MD

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U.S. Army Research, Development and Engineering Command



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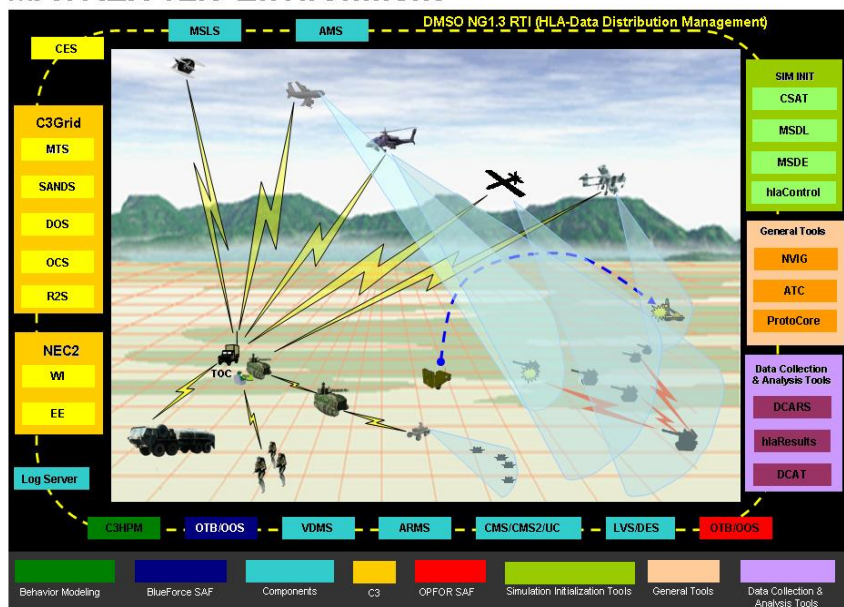
MATREX Leads the Way in Implementing New DOD VV&A Documentation Standards



MATREX Purpose



MATREX v2.0 Environment



Primary Partners and Customers:

- RDECOM HQ, RDECs, and Labs
 - PM FCS (BCT) MSO / FCS LSI
 - TRADOC (BLCSE)
 - 3CE (Cross Command Collaboration Effort) including TRADOC, ATEC, FCS LSI, RDECOM
 - Other Army PMs and PEOs
- Enables reconfiguration and reuse of components for:
 - Engineering model development and evaluation
 - Technology tradeoffs
 - Capabilities assessments
 - Concept development
 - Experimentation
 - Testing
 - Mutually and collectively leverages the world-class expertise of all RDECOM M&S laboratories for the benefit of the Army
 - Supports decision making over entire acquisition cycle

Critical M&S capabilities necessary to support Network Centric Warfare representation and analysis

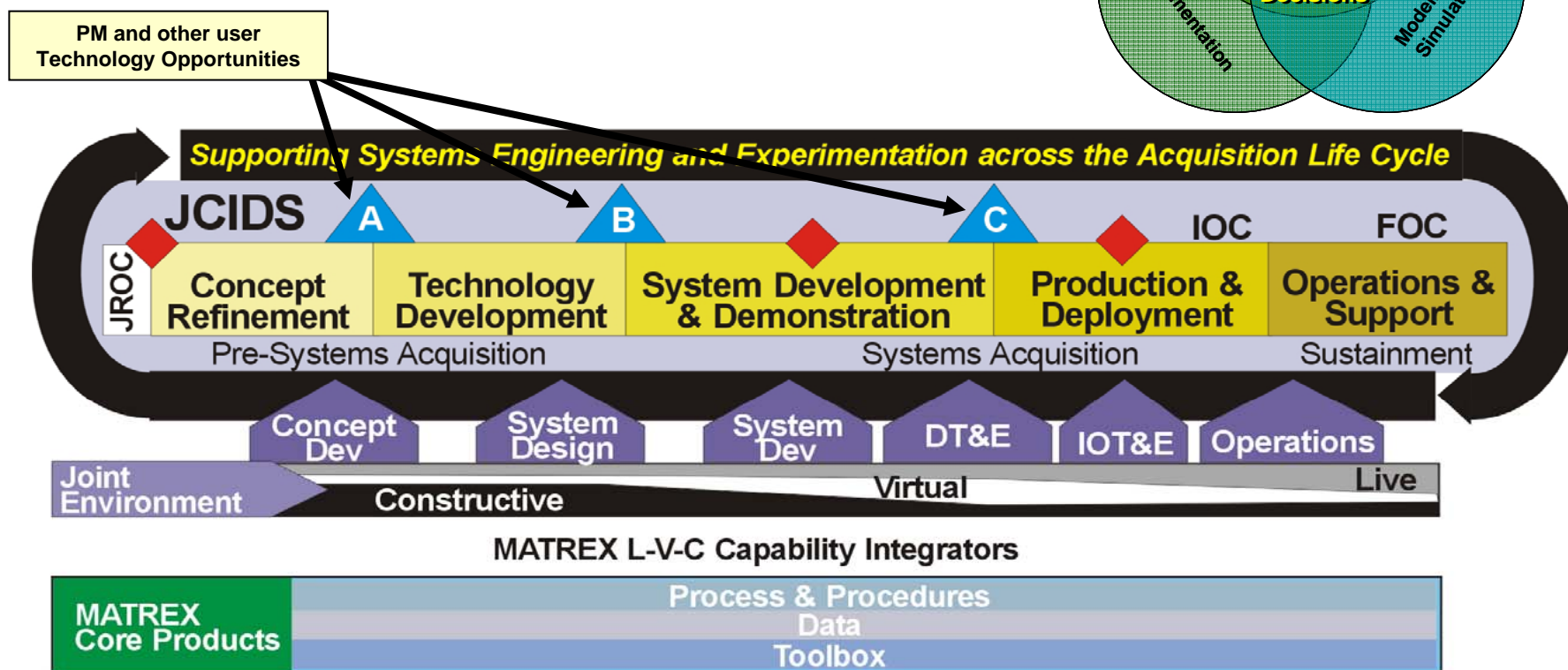
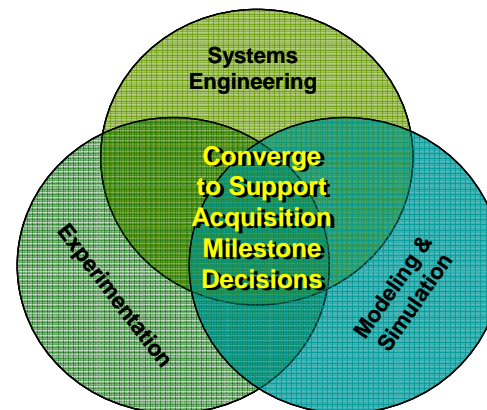
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MATREX Hi-Level Strategy



Enable cross-commodity M&S tools, capabilities, processes and people to support technology development, systems integration and product development across the life cycle.



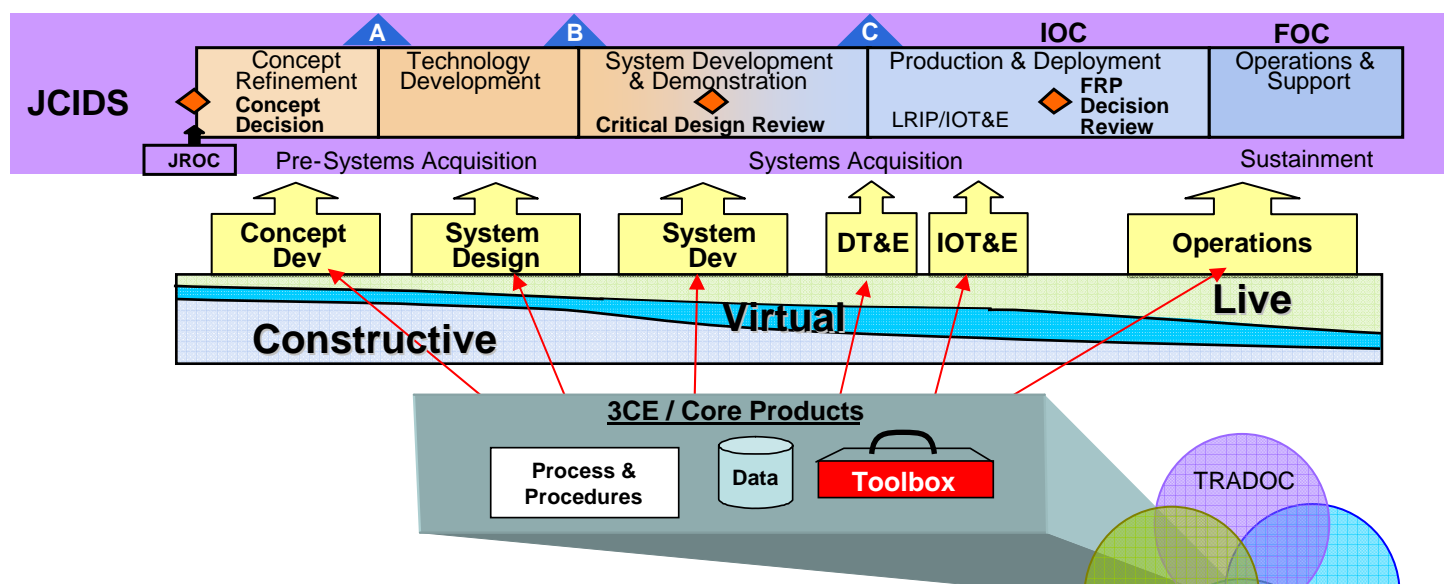
Reduce expense of “Live” activities

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Cross Command Collaboration Effort (3CE)

3CE Mission and Intent

Mission (Vision): *Develop a cross command Army M&S and data environment for design, development, integration, and testing of capabilities, systems, and prototypes.*



Intent:

Purpose: *Identify, develop, and maintain a core set of M&S tools, data, and business processes that provide interoperable connectivity which links the participating organizations, to include providing a common 3CE environment and expertise for the Army to leverage.*

End State: *A 3CE environment that meets the common requirements of all three commands and PM FCS BCT to conduct distributed DOTMLPF development.*

Relevant Today and Into the Future

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MATREX Collaborations



Distributed to

TRADOC	UofA Maneuver Battle Lab Air Maneuver Battle Lab Depth & Simultaneous Attack BL Battle Command Battle Lab TRAC Leavenworth TRAC-WSMR
ATEC	IRCC WSMAR HQ USAOTC USAOTC-IEW Electronic PG, Fort Lewis APG Test Center WDTC, Dugway PG RTTC RTTC-RSA
PM	PEO-STRI NLOS-LS PM FCS (BCT) – FCS LSI
Other Services	LMC-Orlando (USN) Navy Research Lab Naval Air Warfare Center JTAGGS (USAF)



Partners & Collaboration

ATEC (OTC/DTC)

- Test Event Support
- Live Interface
- Sim to C2
- Sim Research

TRADOC

- Analytical Requirements
- BLCSE Conversion to HLA
- FFID Planning
- Sim Infrastructure & Tools

3CE

- Core Planning
- Sim Systems Engineering
- Federation/FOM/Tools
- FCS Spin Out 1
- Sim Infrastructure & Tools

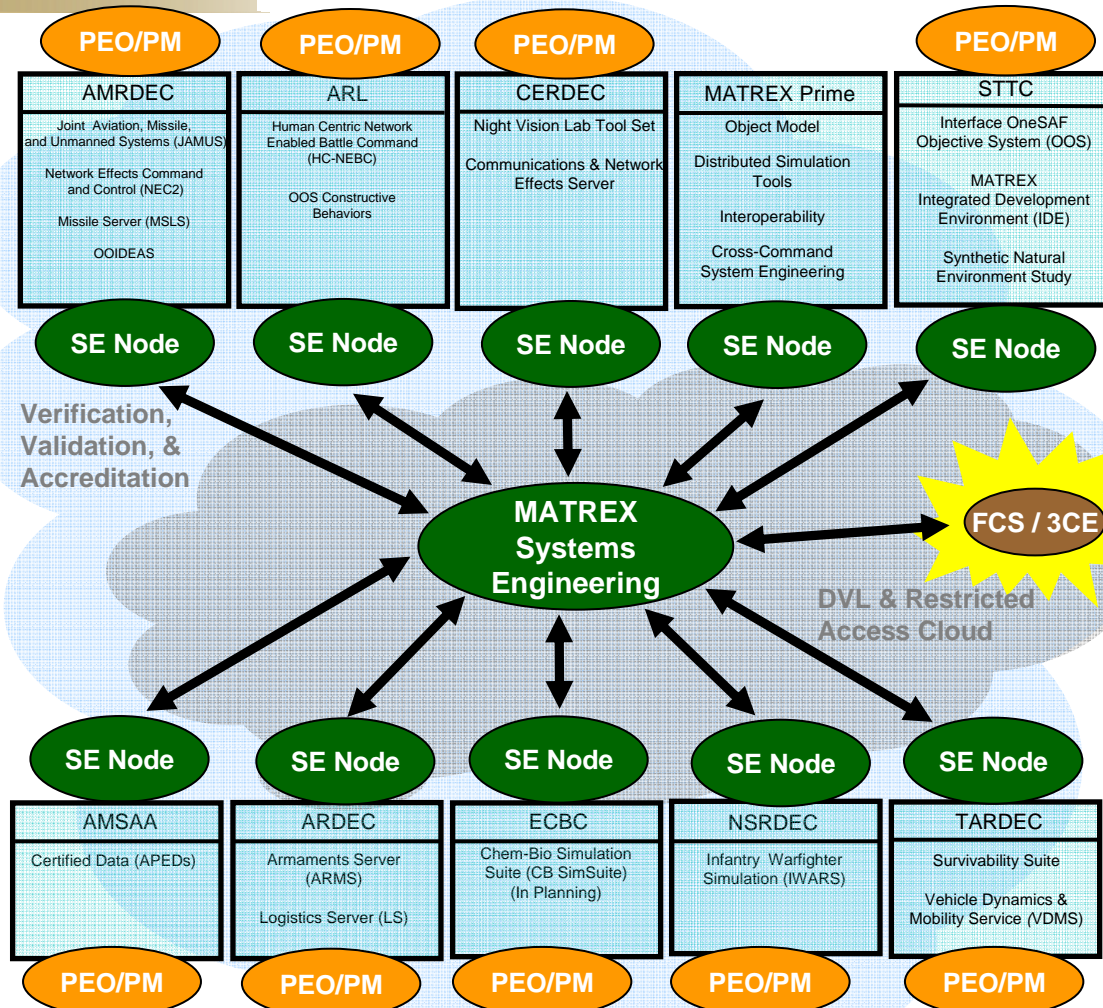
FCS LSI

- FOM
- FCS Simulation Environment (FSE)
- Collaboration & Development
- GFX Delivery, Training & Support

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Systems Engineering for MATREX and RDECOM - Operational View



Integrated M&S System of Systems Engineering Capability for RDECOM via MATREX:

- Supporting PEOs and PMs with a coordinated RDECOM approach
- Common integrating SoS Architecture synchronized across RDECOM
- Standing up SE Nodes for M&S across RDECOM:
 - Integrated M&S Culture
 - Common Engineering Tools
 - Common Requirements Database, terminology, and processes
 - Distributed / Collaborative enabling services:
 - Web Collaboration (STEM, IDE, AKO)
 - DVL Services
- Maximize interoperability, flexibility and adaptation of RDECOM M&S capabilities to the Acquisition Communities needs.
- Common OM and Core Capabilities/Tools

MATREX reduces Technical and Cost Risks for the FCS and other programs through external coordination of RDECOM M&S

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Mission Thread Representation



- **Current Representation**
 - Network Effects Command and Control (NEC2)
 - Joint Close Air Support (JCAS)
 - Human Centric-Network Enabled Battle Command (HC-NEBC)
 - Survivability
 - Night Vision
- **Each Mission Thread is comprised of various components and MATREX tools**

- **Co-Chaired by Simone Youngblood & John Moore**
- **Purpose - Leadership representatives from the DMSO, Army, Navy, Air Force, and National Security Agency met to discuss standardizing VV&A documentation templates to allow for more efficient and consistent retention of VV&A information.**
- **The group defined its objective as "Enabling expanded M&S reuse by building the foundation for consistent V&V information to support accreditation decisions."**



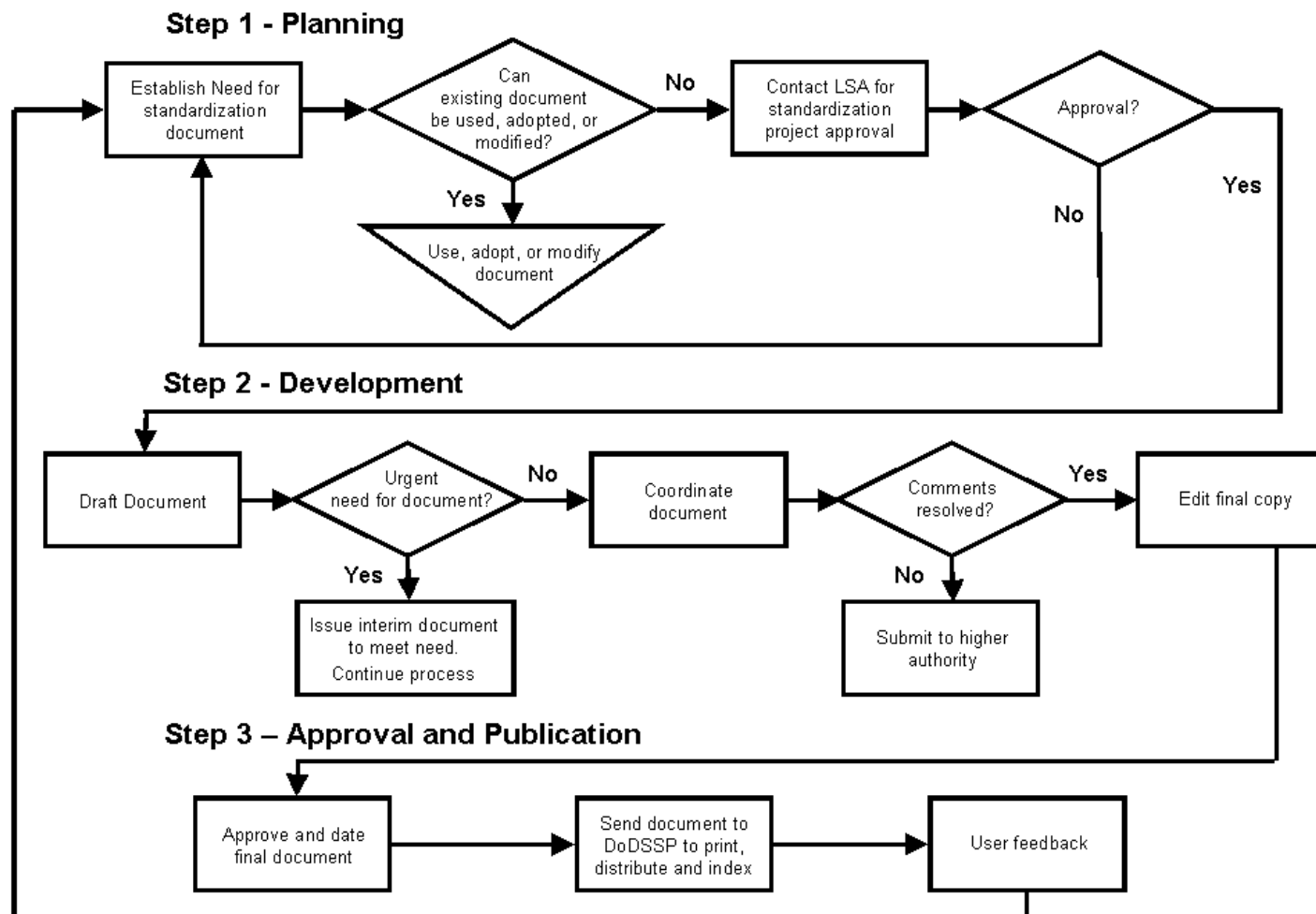
Documentation References



- **DoDI 4120.24, Defense Standardization Program (DSP)**
- **DoD 4120.24-M, Defense Standardization Program (DSP) Policies and Procedures**
- **MIL-STD-962, Department of Defense Standard Practice, Defense Standards Format and Content**
- **SD-1, Defense Standardization Program, Standardization Directory**



DSP Process



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VV&A Challenge



- Many different component developers spread geographically across the US
- Many different uses of the individual components
- Level of VV&A documentation varies from component to component
- VV&A documents have not been developed in a standard format

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- **Consistency of Documentation**
 - All V&V developers will use the same format
 - Information can be easily found
- **Provides a common frame of reference across the MATREX enterprise**
- **Facilitates ease of communication among and between V&V and Accreditation personnel**
- **Builds a body of evidence for future VV&A efforts**



Conclusion



- **MATREX is building an Army solution for M&S experimentation across the acquisition life cycle.**
- **MATREX is advancing simulation technology, infrastructure, and processes to enable better informed decision making.**
- **DoD Documentation Standards are the tool enabling capture and maintenance of information supporting the accreditation of MATREX components and threads**
- **MATREX use of the DoD Standards reduces risk and uncertainty.**

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Acronyms



- 3CE – Cross-Command Collaborative Environment
- ACS – Aerial Common Sensor
- ALCES – Aggregate Level Communications Effects Service
- AMS – Aviation Mobility Service
- AMSWG – (OSD) Acquisition Modeling & Simulation Working Group
- ARMS – Armaments Service
- ATC – Automated Test Capability
- ATEC – Army Test and Evaluation Command
- AUTL – Army Universal Task List
- BCT – Brigade Combat Team
- BLCSE – Battle Lab Collaborative Simulation Environment
- C3HPM – Command, Control, & Communications Human Performance Model
- C3GRID – Command & Control, Computer GRID
- CES – Communications Effects Server
- CMS2 – Comprehensive Munitions & Sensor Server
- CSAT – C4ISR Static Analysis Tool
- C4ISR – Command & Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance
- DCARS – Data Collection, Analysis & Reporting System
- DCA – Data Collection & Analysis
- DCAT – Data Collection & Analysis Tool
- DES – Damage Effects Server
- DOTMPF – Doctrine, Organization, Training, Materiel, Leadership, Personnel & Facilities
- DOS – Dynamic Organization Service
- DTE – Distributed Test Event
- DT&E – Developmental Test and Evaluation
- EE – Effects Engine
- FCS LSI – Future Combat Systems Lead Systems Integrator
- FOC – Full Operational Capability
- FOM – Federation Object Model
- FSE – FCS Simulation Environment
- HLA - RTI – High Level Architecture – Run Time Interface
- HC-NEBC – Human Centric – Network Enabled Battle Command
- HPM – Human Performance Model
- IOC – Initial Operational Capability
- IOT&E – Initial Operational Test and Evaluation
- IER – Information Exchange Requirement
- IP03 – Integrated Process 03, Networked Fires
- IWARS/DI – Infantry Warrior Simulation/Dismounted Infantry
- JCAS – Joint Close Air Support
- JCIDS – Joint Combat Integrated Defense System
- JSBE – Joint Service Battlespace Environment
- KPP – Key Performance Parameters
- LSI – (FCS) Lead Systems Integrator
- LVCI – Live Virtual Constructive Interoperability
- LVS – Lethality/Vulnerability Service
- MATREX – Modeling Architecture for Technology, Research, & EXperimentation
- MC2 – Mobile Command & Control
- MMIC – MATREX Middleware Independence Capability
- MOE – Measures of Effectiveness
- MOP – Measures of Performance
- M&S – Modeling and Simulation
- MSDE – Military Scenario Development Environment
- MSDL – Military Scenario Definition Language
- MSLS – Missile Service
- MSMO – Modeling & Simulation Management Office
- MTS – Message Transceiver Service
- NCW – Network Centric Warfare
- NEC2 – Networked Effects Command & Control
- NVIG – Night Vision Image Generator
- OCS – Organic Communications Service
- OneSAF – One Semi-Automated Forces
- OOS – OneSAF Objective System
- OTB – OneSAF Testbed Baseline
- PEO – Program Executive Office
- PM – Product, or Program or Project Manager
- RDECOM – Research, Development, & Engineering Command
- RDEC – Research, Development & Engineering Center
- SANDS – Situational Awareness Normalization & Dissemination Service
- SE – Systems Engineering
- S3E – Systems Engineering, Experimentation, and Enterprise
- SoSE – System of System Engineering
- SOSCOE – System of Systems Common Operating Environment
- S&T – Science and Technology
- TENA – Test & Training Enabling Architecture
- TIE – Technical Integration Event
- TRADOC – Training & Doctrine Command
- UAV – Unmanned Aerial Vehicle
- UC – Universal Controller
- UJTL – Universal Joint Task List
- USAF – United States Air Force
- USMC – United States Marine Corps
- VDMS – Vehicle Dynamics & Mobility Service
- V&V – Verification and Validation
- WECM – Warfighter Electronic Collection and Mapping
- WI – Warfighter Interface

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